

Application No. 10/509,191
Attorney Docket No. 2002B039A

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (previously presented): A catalyst composition consisting essentially of:

(a) a rhodium component present in an amount such that the catalyst composition comprises less than 3.0% of rhodium by weight of the total catalyst composition; and

(b) an indium component present in an amount such that the catalyst composition comprises at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 2 (Original): The catalyst composition of claim 1 and comprising at least 0.25% and less than 2.5% of rhodium by weight of the total catalyst composition.

Claim 3 (Original): The catalyst composition of claim 1 and comprising at least 0.3% and less than 1.5% of rhodium by weight of the total catalyst composition.

Claim 4 (Original): The catalyst composition of claim 1 and comprising at least 0.4% and less than 4.0% of indium by weight of the total catalyst composition.

Claim 5 (Original): The catalyst composition of claim 1 and comprising at least 0.5% and less than 3% of indium by weight of the total catalyst composition.

Claim 6 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.2 to about 1.1.

Claim 7 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.35 to about 0.75.

Application No. 10/509,191
Attorney Docket No. 2002B039A

Claim 8 (Original): The catalyst composition of claim 1 and also comprising a support.

Claim 9 (previously presented): The catalyst composition of claim 1 wherein the support is selected from alumina, zirconia and ceria-alumina.

Claim 10 (previously presented): The catalyst composition of claim 1 wherein the catalyst composition has been treated in a reducing atmosphere at a temperature of at least 300°C.

Claim 11 (previously presented): A method for making a catalyst composition, the method comprising:

(a) applying a rhodium nitrate to an alumina, zirconia, or ceria-alumina support; and

(b) applying an indium formate or nitrate to the support;
to produce a catalyst composition which comprises 0.3 - 3.0% rhodium and less than 5.0% of indium by weight of the total catalyst composition including the support.

Claim 12 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support concurrently.

Claim 13 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support consecutively.

Claim 14 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by impregnating the support with a solution of the compound.

Claim 15 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by precipitating the compound from a solution containing ions of at least one of rhodium and indium.

Application No. 10/509,191
Attorney Docket No. 2002B039A

Claim 16 (cancelled)

Claim 17 (cancelled)

Claim 18 (cancelled)

Claim 19 (Original): The method of claim 11 and further including, after at least one of (a) and (b), calcining the support at a temperature of about 100°C to about 600°C.

Claim 20 (Original): The method of claim 11 and further including, after (a) and (b), treating the support in a reducing atmosphere at a temperature of about 100°C to about 600°C.

Claim 21 (Original): The method of claim 20 wherein said treating the support is conducted at a temperature of about 300°C to about 500°C.

Claim 22 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition made by the method of claim 11.

Claim 23 (Withdrawn): A process for selectively removing C₂ to C₄ alkynes or diolefins from a feedstock also containing C₂ to C₄ olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition comprising a rhodium component and an indium component, and the process producing an olefin-enriched product stream containing less than 20 weight % of oligomers of said olefins.

Claim 24 (Withdrawn): The process of claim 23 and producing an olefin-enriched product stream containing less than 10 weight % of oligomers of said olefins.

Application No. 10/509,191
Attorney Docket No. 2002B039A

Claim 25 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition comprising:

(a) a rhodium component present in an amount such that the catalyst composition comprises less than 3.0% of rhodium by weight of the total catalyst composition; and

(b) an indium component present in an amount such that the catalyst composition comprises at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 26 (Withdrawn): The process of claim 25 wherein the alkynes or diolefins have 2 to 4 carbon atoms and the feedstock also contains C₂ to C₄ olefins

Claim 27 (Withdrawn): The process of claim 25 wherein said contacting is conducted at a temperature of from about 20°C to about 150°C, a pressure of from about 690 kPa to about 4100 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1 to about 1000.

Claim 28 (Withdrawn): The process of claim 25 wherein said contacting is conducted at a temperature of from about 30°C to about 100°C, a pressure of from about 1400 kPa to about 3400 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1.1 to about 800.

Claim 29 (Withdrawn): The process of claim 25 wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 1 ppm.

Claim 30 (Withdrawn): The process of claim 25 wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 0.5 ppm.

Claim 31 (currently amended): A supported catalyst composition effective for the selective hydrogenation of alkynes and diolefins to olefins comprising an alumina,

Application No. 10/509,191
Attorney Docket No. 2002B039A

zirconia, or ceria-alumina support; having less than 3.0 % rhodium by weight of the total supported catalyst composition, deposited from rhodium nitrate; and having 0.3-5.0% indium by weight of the total supported catalyst composition, deposited from indium nitrate or indium formate.

Application No. 10/509,191
Attorney Docket No. 2002B039A

SUPPORT FOR THE AMENDMENTS

Claims 16-18 have been canceled. As noted by the Examiner in the previous Official Action, the limitations of these claims have already been incorporated into the claims from which they depend.

Claim 31 has been amended to incorporate the limitation that the supported catalyst be effective for the purpose of selectively hydrogenating alkynes and diolefins to monoolefins, as set forth in paragraph [0019] of the Specification as originally filed.

It is believed there is no possibility of new matter.